UNITED STATES PATENT APPLICATION

FOR

POLE REINFORCING STRUCTURES

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POLE REINFORCING STRUCTURES

BACKGROUND OF THE INVENTION

[0001] 1. Field of the Invention:

[0002] The present invention is directed to the field of reinforcing elements to be used within the service utilities industries to reinforce utility poles and the like.

[0003] 2. General Background and State of the Art:

[0004] Wooden utility poles are in common use for stringing power cables, television cables, telephone wires and other types of cables or wires over long distances. While these types of poles may have a substantial life expectancy, they may eventually need to be replaced as a result of age, deterioration or physical damage or to comply with safety regulations. As an alternative to a replacement, which may cause disruption of utility services, reinforcing elements are known which can be lodged into the ground proximate to the utility pole, and then secured to the utility pole in order to reinforce the base structure of the utility pole, thereby increasing the useful life of the utility pole. A representative reinforcing element is illustrated, for example, in U.S. Design Patent No. 425,631 issued May 23, 2000. The reinforcing element of the 425,631 design patent is formed from a bent sheet of steel which may be partially or fully wrapped around a utility pole and driven into the ground to lend support to the utility pole. The design according to the 425,631 patent provides support by bracing and therefore stabilizing the utility pole.

SUMMARY OF THE INVENTION

[0005] The present invention is directed to a utility pole reinforcing element which features a stronger, more structurally sound design having almost completely enclosed or enclosed channels at outer edges of the reinforcing element which when secured to utility poles provides a more structurally resilient reinforcing element for the utility pole. The present invention is depicted in the appended drawings and more fully described in the following detailed description of the invention and as set forth in the appended claims.

BRIEF DESCRIPTION OF THE FIGURES

[0006] Fig. 1 depicts a perspective view of a utility pole reinforcing element of the present invention.

[0007] Fig. 2 depicts a cross-sectional view of the reinforcing element of Fig. 1.

[0008] Fig. 3 depicts a perspective view of a first alternative embodiment of a reinforcing element.

[0009] Fig. 4 depicts a cross-sectional view of the first alternative embodiment of Fig. 3.

[0010] Fig. 5 depicts a perspective view of the second alternative embodiment of the reinforcing element.

[0011] Fig. 6 depicts a cross-sectional view of the second alternative embodiment of Fig. 5.

[0012] Fig. 7 depicts a perspective view of a third alternative embodiment of the reinforcing element.

[0013] Fig. 8 depicts a cross-sectional view of the third alternative embodiment of Fig. 7.

[0014] Fig. 9 depicts a perspective view of a fourth alternative embodiment of the reinforcing element.

[0015] Fig. 10 depicts a cross-sectional view of the fourth alternative embodiment of Fig. 9.

DETAILED DESCRIPTION OF THE INVENTION

[0016] Fig. 1 depicts a perspective view of a pole reinforcing element 10 according to the present invention. The pole reinforcing element 10 includes two hollow cylinders 12 and 14 interconnected by a web 16 that extends from the top 18 to the base (not shown) of the pole reinforcing element 10. The cylinders 12 and 14 and the web 16 are preferably formed from structural grade steel. The steel is preferably galvanized prior to fabrication or galvanized or painted with an environmentally resistant coating after fabrication. The steel components have a thickness in a range of 3 mm to 12 mm. The thickness of the cylinders 12 and 14 may be greater than or less than the thickness of the web 16. The length of the pole reinforcing element 10 can be in a range of 2 to 5 meters in length. However, a length in the range of 2.4 to 2.7 meters for most standard size utility poles is adequate. The width of the web 16 section of the pole reinforcing element 10 can be in the range of 10 cm to 25 cm although larger widths may be appropriate for larger size utility poles. The diameter or width of the cylinders 12 and 14 is preferably in the range of 6 cm to 15 cm.

[0017] Fig. 2 depicts a cross-sectional view of the pole reinforcing element 10 according to Fig. 1. As illustrated in Fig. 2, the web 16 connects to the cylinders 12 and 14 in a manner such that if the plane of the web was extended, it would pass through the centerline of the cylinders 12 and 14. It will be appreciated by those skilled in the art, however, that the line of attachment of the web 16 to the cylinders 12 and 14 may be offset from the centerline of the cylinders.

[0018] Fig. 3 depicts a perspective view of a first alternative embodiment of the pole reinforcing element 10', which also includes hollow cylinders 12 and 14. The web 16' of Fig. 2, however, generally connects tangentially to the cylinders 12 and 14. This construction is more clearly shown

by the cross-sectional view of Fig. 4. For the first alternative embodiment of Figs. 3 and 4, the materials, thicknesses, lengths and widths described above with respect to Fig. 1 are also applicable.

[0019] Fig. 5 depicts a perspective view of a second alternative embodiment of a pole reinforcing element 20. In this embodiment, the web 22 interconnects oppositely disposed channels 24 and 26. The channels 24 and 26 are generally constructed in a hollow rectangular shape, although a square configuration would be applicable. The web 22 is illustrated in the cross-sectional view of Fig. 6 as connecting the channels 24 and 26 generally in the center of the long axis of the channels 24 and 26. However, the web 22 could also be offset from the centerline or even connected to the ends of the channels 24 and 26. With respect to the construction of the pole reinforcing structure 20 depicted in Figs. 5 and 6, the types of materials, thicknesses, lengths and widths described above with respect to the first embodiment would also apply to this design.

[0020] From the three foregoing embodiments of the present invention, it may be appreciated that other types of geometric channel shapes could be attached to the lateral sides of the web. For example, triangular, oval or other types of polygonal columns or channels could be utilized. For ease of fabrication, however, the rectangular or cylindrical channels are preferred.

[0021] Fig. 7 depicts a perspective view of a third alternative embodiment of a pole reinforcing element 30. The configuration of Fig. 7, which is also depicted in the cross-sectional view of Fig. 8, depicts generally triangular shaped elements 32 and 34 connected to the lateral external ends of an angled web 36. The triangular shaped elements 32 and 34 may or may not be closed, although preferably they are close to being closed or completely bounded. The web element 36 may be straight or, as depicted in the figures, may have a bend in the center section to form a flattened "V" shape. For the configuration according to Figs. 7 and 8, the materials, thicknesses, lengths and widths discussed above with respect to Figs. 1 and 2 are also equally applicable to this design.

[0022] Fig. 9 depicts a perspective view of another alternative embodiment of the invention which is also shown in the cross-sectional view of Fig. 10. In this embodiment, a pole reinforcing element 40 includes a web 46 that connects to two hollow channels 42 and 44 as described in the foregoing embodiments of the invention. The web 46, however, only extends partially from the top 48 of the channels 42 and 44 to a mid point 50 above the base 52 of the channels 42 and 44. This configuration will allow the channels 42 and 44 to more readily be driven into the ground next to the utility pole, and only a portion, or no portion, of the web 46 may be driven into the ground.

[0023] In use, the various embodiments of the present invention may be placed against a utility pole or in proximity to a utility pole, either individually or in pairs. They may be placed such that the pole is positioned adjacent to the web of the pole reinforcing elements. The pole reinforcing

elements are then driven into the ground. A hammer, pile driver or similar device may be used to place the pole reinforcing element. Alternatively, a device to vibrate the pole reinforcing element into the ground may be used as is known in the art. After the pole reinforcing element is fixed in the ground, metal strapping elements and/or bolts may be used to secure the pole reinforcing element to the utility pole.

[0024] Generally, the pole reinforcing element is driven into the ground to approximately one-half of its length. However, the ground or soil conditions, the integrity of the base of the utility pole and other environmental factors may be considered in determining the length of the pole reinforcing element and the division between the length driven into the ground as opposed to the length extending above the ground available to secure the utility pole. Moreover, for the embodiment with the web only partially extending from the top to some mid point before reaching the base of the geometric channels, a greater percentage of the length of the pole reinforcing element including the web may remain protruding from the ground.

[0025] It may be appreciated by those skilled in the art that the utility pole can be secured at multiple locations on the lower portion of the utility pole, and that preferably the utility pole is secured both proximate to the ground and proximate to the top of the pole reinforcing element in addition to being secured at intermediate locations on the free standing portions of the utility pole and pole reinforcing element. As an alternative, the utility pole and the pole reinforcing element can be continuously wrapped from the bottom portion extending from the ground all the way to the top of the pole reinforcing element to maximize the securement of the pole reinforcing element to the utility pole.

[0026] Having described the preferred and alternative embodiments of the present invention, it is recognized that those skilled in the art will be able to make modifications of the design, which remain contemplated by the present invention in the scope of the claims appended hereto. Accordingly, the invention is to be understood as being represented by the foregoing specification but limited only by the appropriate scope of the appended claims.